

DELAWARE MATERIAL SPECIFICATION

ROCK FOR RIPRAP MS 213

1. SCOPE

This specification covers the quality of rock to be used in the construction of rock riprap.

2. QUALITY

Individual rock fragments shall be dense, sound and free from cracks, seams and other defects conducive to accelerated weathering. The rock fragments shall be angular to subrounded in shape. The least dimension of an individual rock fragment shall be not less than one-third the greatest dimension of the fragment. Rounded river rock is not acceptable for material for use as riprap.

Except as provided below, the rock shall have the following properties:

- a. Bulk specific gravity (saturated surface-dry basis) not less than 2.5.
- b. Absorption not more than 2 percent by weight.
- c. Soundness: Weight loss in 5 cycles not more than 10 percent when sodium sulfate is used or 15 percent when magnesium sulfate is used.

The bulk specific gravity and absorption shall be determined by ASTM Method C-127. The test for soundness shall be performed by ASTM Method C-88 for coarse aggregate modified as follows:

- (1) The test sample shall not be separated into fractions. It shall consist of 5000 + 300 grams of rock fragments, reasonably uniform in size and shape and weighing approximately 100 grams each obtained by breaking the rock and selecting fragments of the required size.
- (2) After the sample has been dried, following completion of the final test cycle and washing to remove the sodium sulfate or magnesium sulfate, the loss of weight shall be determined by subtracting from the original weight of the sample the final weight of all fragments which have not broken into three or more pieces.

The report shall show the percentage loss of weight and the results of the qualitative examination.

If the drawings permit the use of Technical Release #71, Rock Material Field Classification Procedures to determine quality in lieu of 2.a, b, c, (1) and (2) above, the following basic element values must be met or exceeded.

Degree of Weathering	-	B
Estimated Strength	-	B
Discontinuities	-	C
Unit Weight	-	B

Rock that fails to meet the requirements stated above may be accepted only if similar rock from the same source has been demonstrated to be sound after 5 years or more of service under conditions of weather, wetting and drying, and erosive forces similar to those anticipated for the rock to be installed under this specification.

3. **GRADATION**

The rock shall conform to the specified grading limits specified on the drawings.